

REVIEW OF THE LOPHOBRANCHIATE FISHES
(PIPE-FISHES AND SEA-HORSES) OF SOUTH AUSTRALIA.

BY EDGAR R. WAITE, F.L.S., DIRECTOR,

AND

HERBERT M. HALE, ASSISTANT, SOUTH AUSTRALIAN MUSEUM.

Text figs. 39-56.

IN preparing this paper we have examined all the cognate material preserved in the South Australian Museum, a large proportion of which was dredged at various times in St. Vincent Gulf, by Sir Joseph Verco, President of the Royal Society of South Australia.

This material was used by A. H. C. Zietz ⁽¹⁾ in listing the Syngnathoids of South Australia; as our determinations differ considerably from those by Zietz, we indicate in the following table the relative findings, the first column indicating the species as listed and now determined as shown in the second column.

| | |
|---|---|
| <i>Syngnathus curtirostris</i> Cast. | <i>Syngnathus curtirostris</i> Cast. |
| <i>Syngnathus semifasciatus</i> Günth. | <i>Histiogamphelus rostratus</i> sp. nov. |
| <i>Syngnathus poecilolaemus</i> Peters. | <i>Syngnathus poecilolaemus</i> Peters. |
| <i>Syngnathus pelagicus</i> Linn. | <i>Stigmatopora nigra</i> Kaup. |
| <i>Syngnathus olivacea</i> Cast. | <i>Stigmatopora argus</i> Rich. |
| <i>Syngnathus argus</i> Rich. | <i>Stigmatopora argus</i> Rich. |
| <i>Ichthyocampus filum</i> Günth. | <i>Syngnathus vercoi</i> sp. nov. |
| <i>Leptoichthys castelnaui</i> Macleay. | <i>Leptoichthys fistularius</i> Kaup. |
| <i>Doryichthys heterosoma</i> Bleek. | <i>Histiogamphelus rostratus</i> juv. |
| <i>Solenognathus spinosissimus</i> Günth. | <i>Solenognathus robustus</i> McCull. |
| <i>Phyllopteryx foliatus</i> Shaw. | <i>Phyllopteryx foliatus</i> Shaw. |
| <i>Phyllopteryx eques</i> Günth. | <i>Phyllopteryx eques</i> Günth. |
| <i>Hippocampus novae-hollandiae</i> Steind. | <i>Hippocampus novae-hollandiae</i> Steind. |
| <i>Hippocampus breviceps</i> Peters. | <i>Hippocampus breviceps</i> Peters. |

The complete list of the South Australian members of the Order Lophobranchii, as now determined, stands as follows:

(1) Zietz, Trans. Roy. Soc. S.A., xxxii, 1908, p. 298, 299.

SYNGNATHINAE

- Syngnathus poecilolaemus* Peters.
 .. *phillipi* Lucas.
 .. *zercoi* sp. nov.
 .. *curtirostris* Castelnau.
Leptonotus costatus sp. nov.
Histiogamphelus rostratus sp. nov.
Ichthyocampus cristatus McCulloch and Waite.
Lissocampus caudalis gen. et sp. nov.
Leptoichthys fistularius Kaup.
Stigmatopora argus Richardson.
 .. *nigra* Kaup.

HIPPOCAMPINAE

- Solegnathus robustus* McCulloch.
Phyllopteryx foliatus Shaw.
 .. *eques* Günther.
Acentronura australe sp. nov.
Hippocampus abdominalis Lesson.
 .. *nozae-hollandiae* Steindachner.
 .. *breviceps* Peters.

All the species are figured, mostly from photographs of specimens in this Museum taken by H. M. Hale. It should be noted that in such as are bent to economise space, it has not been possible to maintain the dorsal side of the tail uppermost. Three of the illustrations have been previously published by McCulloch or Waite.

The numbers of fin rays and annuli, as expressed at the head of the descriptions, indicate the variations found in specimens examined by us; the figures within brackets show the wider range recorded by others.

Writers have frequently used the term "South Australia" in the sense of Southern Australia, and species taken in Port Philip, for example, have been thus subsequently included in the fauna of our State. Such an instance we believe to be furnished by *Leptonotus semistriatus* Kaup, which so far as we know does not occur here, its place being taken by *L. costatus*, though "South Australia" is given as the type locality for the former species.

SYNGNATHUS Linnaeus, 1758 (acus).

We have not here used *Corythoichthys* (*κορυθός-ιχθύς*) as distinct from *Syngnathus*. Kaup, who founded the genus, does not give satisfactory generic

characters, a lack which others have attempted to supply. Jordan and Snyder⁽²⁾, who perpetuate the spelling of the word as *Corythoichthys* ("κορυθπος-ιχθες") place in that genus those forms which, in contradistinction to *Syngnathus* are rather robust and have the opercle crossed by a horizontal ridge. Duncker⁽³⁾ separates the genera on characters of the egg-pouch and ascribes *Corythoichthys* to himself. Jordan⁽⁴⁾ points out that the genus is synonymous with *Hippichthys* Bleek⁽⁵⁾, of which Günther⁽⁶⁾ wrote, in effect, "The generic name *Hippichthys* is proved to be useless."

Authors recognizing the validity of the genus *Corythoichthys* would, of the four following species, place *S. poecilolaemus*, *S. phillipi* and *S. vercoi* therein, and *S. curtirostris* in *Syngnathus* if determined by the presence or absence of an opercular ridge.

We find that an opercular ridge is developed in the young of *Histiogamphelus rostratus* and *Stigmatopora argus*, but is not to be found in the adults, a fact that greatly minimizes the value of a character largely used in the classification of the Lophobranchiates. At best it can scarcely be employed for divisions higher than species.

Günther⁽⁷⁾ records "many specimens" of *Syngnathus pelagicus*, from South Australia, presented to the British Museum by Sir G. Grey. Among the extensive series of Syngnathoids preserved in this Museum, there is none that we can associate with this species, and the examples so identified by Zietz prove to be of *Stigmatopora nigra*. *S. pelagicus* is not by us included in the fauna of this State. It may also be noted that specimens therewith identified from New Zealand have been referred to another species⁽⁸⁾.

a. Opercular ridge present.

| | | | | | | |
|------|-----------------------------------|----|----|----|----|----------------------|
| b. | Snout more than half the head.. | .. | .. | .. | .. | <i>poecilolaemus</i> |
| bb. | Snout half the head .. | .. | .. | .. | .. | <i>phillipi</i> |
| bbb. | Snout less than half the head.. | .. | .. | .. | .. | <i>vercoi</i> |
| aa. | No opercular ridge, snout short.. | .. | .. | .. | .. | <i>curtirostris</i> |

SYNGNATHUS POECILOLAEMUS Peters.

Syngnathus poecilolaemus Peters, Monatsb. Akad. Wiss. Berlin, 1869, p. 458;

(2) Jordan & Snyder, Proc. U.S. Nat. Mus., xxiv, 1901, p. 7.

(3) Duncker, Fauna Südwest Aust., ii, 1909, p. 237.

(4) Jordan, Genera of Fishes, ii, 1919, p. 253.

(5) Bleeker, Verh. Bat. Genootsch., xxii, 1849, p. 15.

(6) Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 173.

(7) Günther, *loc. cit.* p. 166.

(8) Waite, Rec. Cant. Mus., i, 1912, p. 318.

Dum., Hist. Nat. Poiss., ii, 1870, p. 552; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 174; Macl., P.L.S., N.S.W., vi, 1881, p. 290.

Syngnathus poccilolaemus Cast., P.Z.S., Vict., ii, 1873, p. 78.

Syngnathus modestus Sauv., Bull. Soc. Phil. (7) iii, 1879, p. 209 (not of Günth).

Syngnathus pockilolaemus Dunck., Fauna Südwest Aust., ii, 1909, p. 245.

Corythoichthys poccilolaemus McCull., Rec. W. Aust. Mus., i, 1912, p. 82, fig. 2.

Fig. 39.

D.26-29: P.12 (11): A.3: C.10: Annuli 19-20+44-49: sub-dorsal annuli 1-2+5-6: brood annuli 0 (i)+16-18.

Head 1.4 in the trunk and 7.4 in the total length: trunk 2.4 in the tail: snout 1.75 in the head: eye 4.5 in the snout and 8.0 in the head.

Snout nearly twice as long as the post-orbital portion of the head, with a low median crest which extends on to the interorbital space: another from the top of the snout extends nearly to the nostrils, supraorbital ridge commences at

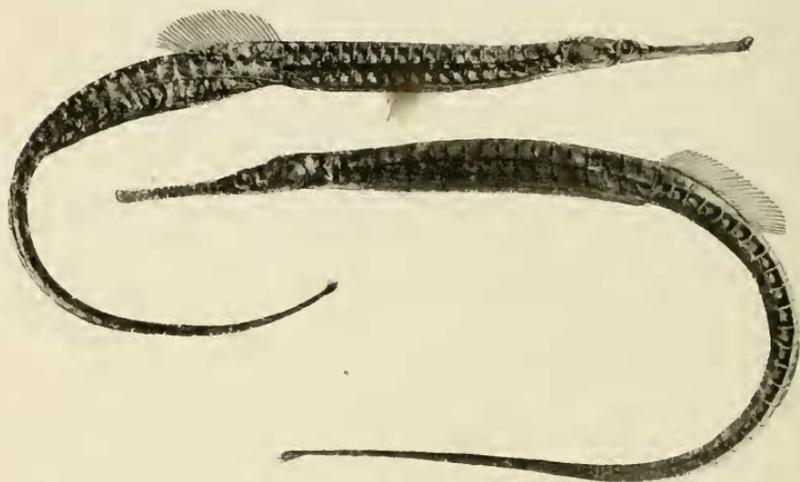


Fig. 39. *Syngnathus poccilolaemus*, male and female.

a point in advance of the eye equal to its diameter and is continued behind the eye for the same distance, occipital and nuchal ridges low: opercle with slightly raised reticulating lines and a prominent median ridge. Body a little deeper than broad with the ridges well defined: upper ridge continued on to the sixth caudal scute: median lateral ridge terminates on the last body scute below the

origin of the upper caudal ridge, which commences on the side and attains the dorsal angle at the sixth caudal scute: lower lateral ridge continuous: a ventral body ridge. Pectoral and caudal fins as long as the eye. Many specimens from Spencer and St. Vincent Gulfs, dredged by Sir Joseph Verco, the longest being 270 mm.

Colours. *Male:* Head light, yellowish brown, with irregular, vertical bars or mottlings on the snout: underside of snout and head pale. Body brown, darker above, with about thirteen large, dark brown spots on the back between the nape and the caudal fin. Front edge of the anterior caudal scutes with a large, dark brown mark, the intensity of which diminishes backwards and disappears at the eighth or ninth caudal scute: other irregular and scattered markings on the tail. Ovisac milky white with two dark streaks on each side.

Female. From the examination of thirteen male and eleven female specimens it appears that, in the female, the lower half of the snout, the throat and the neck are invariably marked with series of small, dark brown dots; such are absent in the male.

Hab. South and Western Australia.

SYNGNATHUS PHILLIPI Lucas.

Syngnathus phillipi Lucas, P.R.S., Vict., iii (n.s.), 1891, p. 12; Dunck., Fauna Südwest Aust., ii, 1909, p. 245.

Corythoichthys phillipi McCull., Endeavour Res., i, 1911, p. 26, fig. 10.

Fig. 40.

D.22-25 (28): P.10 (11-12): A.2-3: C.10: Annuli 18-20+41-43 (40-48): sub-dorsal annuli 1 (2)+5-6; brood annuli 0 (1)+16 (15-18).

Head 2.0 in the trunk and 8.0 in the total length: snout 1.9 in the head: eye 3.4 in the snout and 7.9 in the head: trunk 2.4 in the tail.

Snout as long as the rest of the head, narrow, with a low median crest extending on to the interorbital space: a low ridge from the end of the snout to the first nostril: interorbital space concave: the strongly marked supraorbital ridges extend behind the eye to a distance equal to its diameter or to below the origin of the upper body ridge: opercle with granular, radiating striae and a prominent median keel. A long occipital ridge and a nuchal ridge extending to the posterior edge of the second body scute. Body deeper than wide, its depth equal to twice the diameter of the eye. Ridges well defined: upper ridge terminates on the fifth caudal scute: median lateral ridge extends on to the last body scute, beneath the origin of the upper caudal ridge: lower lateral ridge continuous: a strong ventral keel terminating at the anus. Anal fin minute. Length

130 mm.: several examples dredged in Spencer Gulf by Sir Joseph Verco, and a single specimen collected in St. Vincent Gulf by Mr. P. Geisler.

Colours. *Male:* Head and snout brown above with white mottlings: opercular ridge with five dots along its length, decreasing in size backwards: chin opalescent with white markings. Body brown above, ventral surface lighter: back with about sixteen pairs of irregular, whitish spots between the nape and the end of the tail: upper half of each lateral body scute with a brown bar: anterior part of lower lateral ridge with a row of seven white spots decreasing in size backwards: ventral ridge black. Brood-pouch whitish, streaked with brown: sub-caudal scutes light brown with a dark brown spot on each side of the anterior edges. Caudal fin dusky.

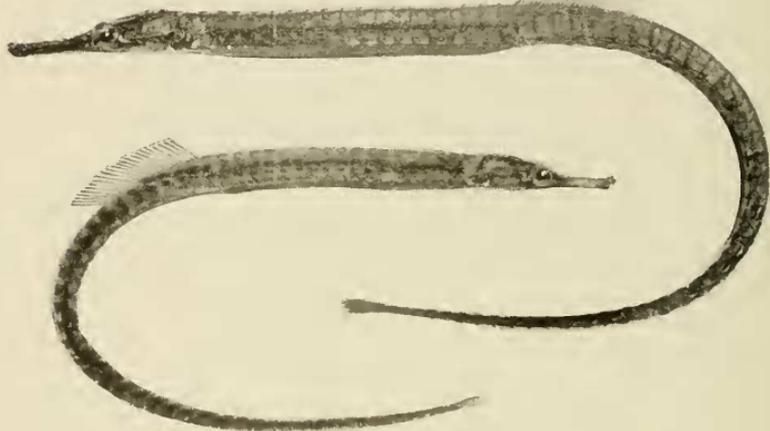


Fig. 40. *Syngnathus phillipi*, male and female.

Female. The colouration of the head differs somewhat from that of the male. Upper side of the head and snout pale brown, darker on the occiput: underside with a row of dark brown dots on each side, extending from the anterior portion of the snout to the termination of the opercular ridge: two dots below the lower posterior edge of the eye. Three irregular rows of dark spots on the anterior ventral surface of the body.

Hab. Western and South Australia and Victoria.

SYNGNATHUS VERCOI sp. nov.

Ichthyocampus flum Zietz, T.R.S., S.A., 1908, p. 298 (not of Günth.).

Fig. 41.

D.20; P.10; A.2; C.10; Annuli 16+43; sub-dorsal annuli 0+5; brood annuli 0+14.

Head 2.5 in the trunk and 10.3 in the total length; trunk 2.6 in the caudal; snout 2.5 in the head; eye 2.0 in the snout and 5.0 in the head.

Snout as long as the postorbital portion of the head; a median crest extends from its tip on to the interorbital space and is thence continued as an occipital and a nuchal crest on to the first body ring; another ridge on each side from the top of the snout to the first nostril; a strong, median opercular keel; supraorbital ridges prominent and sub-continuous with the upper body ridges. Body one and one-half times deeper than wide, the angles well defined; upper ridge terminates on the fourth caudal scute; median lateral ridge extends on to the first caudal

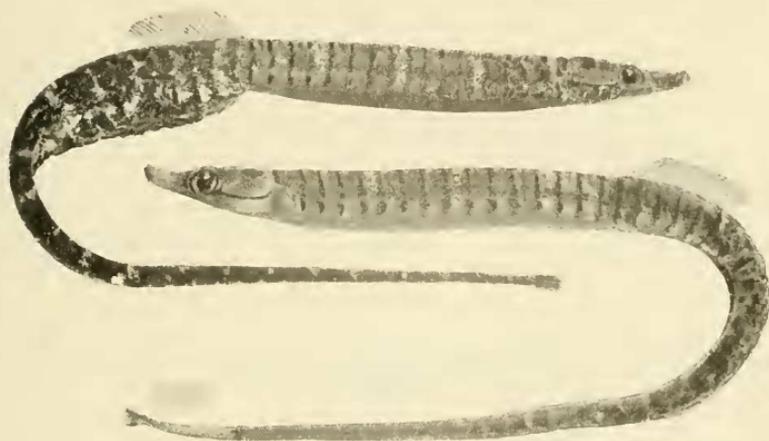


Fig. 41. *Syngnathus vercoi*, male and female.

scute below the origin of the upper caudal ridge; lower lateral ridge continuous; ventral surface of trunk V-shaped and ridged. Pectoral and caudal fins each a little longer than the eye; anal fin minute. Described from a male 103 mm. in length, dredged in Spencer Gulf by Sir Joseph Verco.

Colours. Head brown, with a dark mark across the occiput and another on the nape; snout and opercles with small white spots; underside of snout pale; chin dark brown with white markings. Body brown with four narrow whitish bars across the back, continued on the sides, which are crossed by dark bars, one on each body scute; the ventral surface lighter. Tail with about ten whitish bars

above and on the sides but no dark bars. Back and sides of the body and lower surface of tail with numerous small white dots. Ovisac brown, largely streaked with white, a large irregular, white blotch below each scute.

Several other examples from the same locality yield the following variation in the formulae:

D.18-20: Annuli 16-17+41-43; sub-dorsal annuli 0-1++5.

The eggs are placed in two rows in the ovisac.

Hab. South Australia.

SYNGNATHUS CURTIROSTRIS Castelnau.

Syngnathus curtirostris Cast., P.Z.S., Vict., i, 1872, p. 243 and ii, 1873, p. 79; Macl., P.L.S., N.S.W., vi, 1881, p. 290; Dunck., Fauna Südwest Aust., ii, 1909, p. 244; McCull. and Waite, Rec. S.A. Mus., i, 1918, p. 39, pl. v, fig. 1.

Fig. 42.

D.21-24 (20): P.8-9: A.3: C.10: Annuli 18-19+43-44 (+2): sub-dorsal annuli 0-1++5: brood annuli 0+16.

Snout 2.5 to 2.7 in the head: eye 1.8 in the snout and 5.0 in the head: head 3.0 to 3.5 in the trunk and 11.2 in the total length. (In describing this species Castelnau remarks: "Snout . . . only once and a half in the orbit": this should be read as: orbit 1.5 in the snout.)

Snout about as long as the postorbital portion of the head, with a low crest: interorbital space slightly concave, convex on the median line: head with reticu-

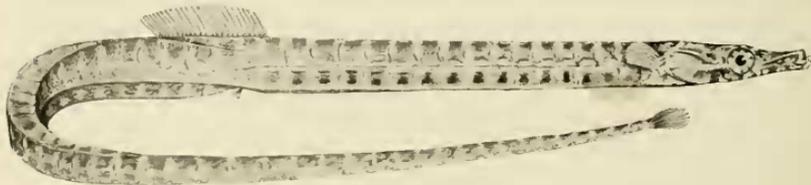


Fig. 42. *Syngnathus curtirostris*.

lating raised lines: opercle with radiating series of raised lines but no keel: supraorbital, occipital and nuchal ridges feeble. Body a little deeper than wide, its depth equal to the length of the snout: angles well defined: upper body ridge extends to below the hinder part of the dorsal fin: median ridge terminates above the vent, below the origin of the upper caudal ridge: lower lateral ridge continuous: ventral surface a little wider than that of the dorsal. Caudal fin rounded, longer than the eye. Specimens collected from Spencer Gulf by Sir

Joseph Verco; St. Vincent Gulf, Mr. A. G. Edquist; Glenelg River, near Mount Gambier, Mr. W. B. Poole; Kangaroo Is., Waite. Longest example 164 mm. long.

Colours. An adult male is brown, the head with a broad cross-band on the occiput and another between the eyes; lower surfaces with irregular brown bars radiating from the eye and enclosing white interspaces. Body with slightly darker cross-bars on the back; light oval spots encircle the lateral ridge on each ring and also the junctions of the rings; large dark spots on the lower half of each segment of the trunk. Tail and egg-pouch variegated with brown, reticulating lines.

In a female the ground colour is dark brown; the snout and opercles mottled with white and a series of white dots encircles the eye; interorbital space with a white bar connecting the front edges of the eyes; a few white marks on the occiput. Sides of body and tail with irregular grey marks; underside of trunk light brown with white mottlings. Dorsal fin pale with small brown spots; caudal fin brown.

Hab. South Australia.

LEPTONOTUS Kaup, 1853 (*blainvillianus*).

Differs from *Syngnathus* in that the females have the dorsal profile conspicuously elevated and the ventral surface acute.

- a. Size larger: opercle without ridge, dorsal rays 38 (*semistriatus*)
 aa. Size smaller: opercle with basal ridge, dorsal rays 24-32.
 b. Sub-dorsal annuli 1+5 (*caretta*)
 bb. Sub-dorsal annuli 5-6+3-4 *costatus*

LEPTONOTUS COSTATUS sp. nov.

Fig. 43.

D:28; P:10; A:2; C:10; Annuli 17+37; sub-dorsal annuli 6+4.

Snout 2.6 in the head and 1.2 in the post-orbital portion; eye 2.5 in the snout and 6.5 in the head; head 2.5 in the trunk and 9.2 in the total length; trunk 2.2 in the tail.

Snout short, with a median crest which bifurcates posteriorly to form the strongly marked supra-orbital ridges; another ridge on each side from the top of the snout to the front edge of the eye; interorbital space concave; opercle with radiating striae and a ridge on the anterior half; distinct occipital and nuchal ridges. Body less than one-third as broad as deep, with the ridges well defined; back nearly flat and the whole ventral surface acute and keeled; upper ridge terminates on the third caudal scute; upper lateral ridge extends on to the last body

scute, below the origin of the caudal ridge: lower lateral ridge continuous with that of the tail. Pectoral and caudal fins about as long as the eye: anal fin minute.

Described from an example 119 mm. in length, one of two females dredged in Spencer Gulf by Sir Joseph Verco.

Several other specimens collected from St. Vincent Gulf by Mr. P. Geisler. In these the variation of the formulae is as follows: D.29-32: Annuli 16-17+37-38: sub-dorsal annuli 5-6+3-4: brood annuli 0-11. In a male the breadth of the body is two-thirds its depth.

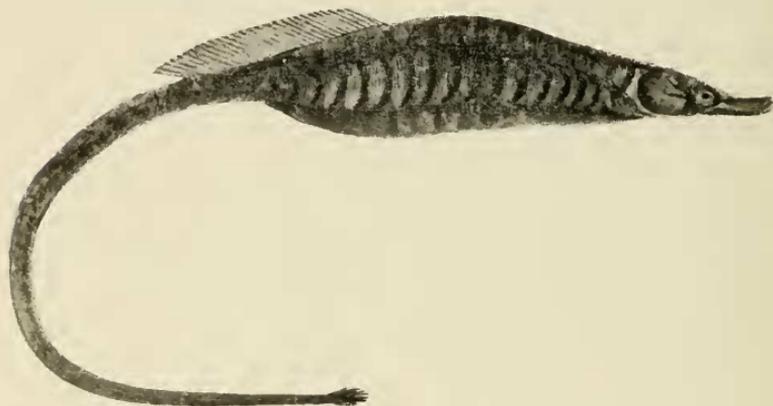


Fig. 43. *Leptonotus costatus*.

Colours. *Female:* A dark bar from snout to eye, thence to pectoral. Body olive-green above: sides opalescent, each scute with a vertical, crescent-shaped bar, the convexity directed forward. Tail olive with a few darker bars anteriorly. *Male:* Ground colour darker and the markings not so well defined: brood pouch sooty.

Hab. South Australia.

This species differs from *L. semistriatus* Kaup in having a shorter snout, the front half of the opercle with a ridge, the vent placed posterior to the middle of the dorsal, which has a smaller number of rays, and the annuli in smaller number. It is apparently also a smaller species, being adult at half the recorded size of *L. semistriatus*. The type of the latter is stated by Günther to be from "South Australia," for which we would read Southern Australia, the known habitat being Victoria and Tasmania.

Duncker⁽⁹⁾ suggests that *Syngnathus caretta* Klunz. is a synonym of *S. semifasciatus* Günth. (= *L. semistriatus* Kaup), and we therefore presume it to be referable to the genus *Leptonotus*. We would say that it is more nearly approached by the species here described, which agrees with it in size and in having the basal half of the opercle keeled. *S. caretta* differs from *L. costatus* in having the dorsal fin mainly on the tail, also in the relative length of the trunk, it being half the total length, whereas in *L. costatus* it is less than one-third. The former species is from Victoria, the latter from South Australia.

HISTIOGAMPHELUS McCulloch, 1914 (*briggsii*).

- a. Dorsal rays 23-24, on 5+2 rings.
 b. Annuli 18+27; snout? (*cristatus*)
 bb. Annuli 22+36; snout short (*briggsii*)
 aa. Dorsal rays 32-33, on 1-3+7-8 rings.
 Annuli 25-26+44; snout long *rostratus*

HISTIOGAMPHELUS ROSTRATUS sp. nov.

Syngnathus semifasciatus Zietz, T.R.S., S.A., xxii, 1908, p. 298 (not of Günth.).

Doryichthys heterosoma Zietz, *loc. cit.* p. 299 (not of Bleek).

Fig. 44.

D.33; P.12; A.2; C.10; Annuli 25+44; sub-dorsal annuli 3+7.

Head 1.9 in the trunk and 6.3 in the total length; snout 1.5 in the head; eye 7.4 in the snout and 10.9 in the head. Trunk 1.7 in the tail and 3.2 in the total length.

Snout very long, twice the length of the rest of the head, deep and much compressed; the anterior portion deepest, more than twice as deep as wide; a high, elevated, knife-like, median crest which bifurcates to form the supraorbital ridges; the distance between the fork and the front edge of the eyes equal to the diameter of the eye; top of head with reticulating raised lines; sides of snout and opercles with radiating striae; occipital and nuchal ridges low. Body a little deeper than wide; ridges well defined, very prominent on the hinder part of the tail; upper ridge continued on to the sixth caudal scute; median lateral ridge terminates on the last body scute, below the origin of the upper caudal ridge, which commences on the side and attains the dorsal angle at the eighth caudal scute; lower ridge continuous. Ventral surface a little wider than that of the dorsal. Length of caudal fin equal to the depth of the body; a minute anal fin.

Described from an example 240 mm. in length, from Spencer Gulf.

(9) Duncker, Fauna Südwest Aust., ii, 1909, p. 244

Colours. Head brown with white markings edged with dark brown, more pronounced in the neighbourhood of the eye. Body and tail brown, darker above with about sixteen light cross bars between the nape and the caudal fin; lower half of the lateral surfaces with fine white mottlings; ventral surface of trunk with large white markings; that of tail without markings, the edges of the scutes darker. Caudal fin black, tipped with white.

The variation in the formulae of four adult specimens is as follows: D. 32-33. Annuli 25-26+44; sub-dorsal annuli 1-3+7-8.

Six specimens are known, namely two adults and one young dredged in Spencer Gulf by Sir Joseph Verco, one from Whidbey Is., Eyre Peninsular, one

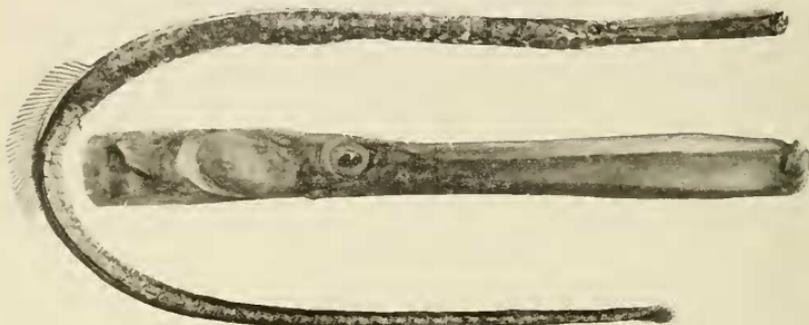


Fig. 44. *Histiogamphelus rostratus*.

taken by Waite on a dredging excursion of the Field Naturalists' Section of the Royal Society of South Australia in February, 1917, and one collected by Mr. E. Le G. Troughton at Kangaroo Is., 1920. Longest specimen 283 mm.

The young example referred to is 128 mm. in length, it has a distinct median keel on the anterior half of the opercle and all the body and tail ridges are spinigerous, both these features being absent in the adult. Zietz's record of *Doryichthys heterosoma* is based on this specimen, his determination being doubtless influenced by the facts that in that species each ring terminates in a spine and the operculum is ridged, as in the young of *H. rostratus*.

Hab. South Australia.

ICHTHYOCAMPUS Kaup, 1853 (*belcheri*).

ICHTHYOCAMPUS CRISTATUS McCulloch & Waite.

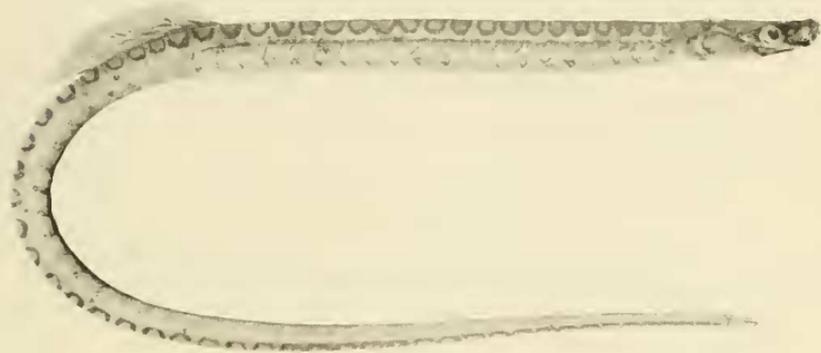
Ichthyocampus cristatus McCull. & Waite, Rec. S.A. Mus., i, p. 40, fig. 26.

Fig. 45.

D.26-27; P.12; C.8; Annuli 19-20+40-41; sub-dorsal annuli 1-2+5; brood annuli 0+13.

Snout 3.4 in the head; eye 1.3 in the snout and 4.7 in the head; head 3.6 to 4.4 in the trunk and 13.3 to 15.3 in the total length; trunk 1.8 to 2.1 in the tail.

Snout much shorter than the postorbital portion of the head, with an elevated, obtuse crest which bifurcates to form very feeble supraorbital ridges: these are continued backwards on each side of the head to behind the eyes: interorbital space flat, with a low median ridge, sub-continuous with the rostral crest and the indefinite nuchal ridge: opercle with granular radiating striae and a low median ridge. Occiput and nape slightly elevated: head and body uniformly granular: body as deep as broad, with well defined angles: back slightly concave, upper

Fig. 45. *Ichthyocampus cristatus*.

and lower ridges continuous: lateral body ridge extends on to the two anterior tail rings and is deflected downwards on the second: ventral ridge low. Anal fin minute. Described from four examples from Spencer and St. Vincent Gulfs, the longest being 214 mm. in length. The type was dredged in Spencer Gulf by Sir Joseph Verco and is "completely bleached": the colour description and the illustration are made from a specimen collected in August, 1920, at Glenelg by Messrs. Zietz and Hale.

Colours. Ground colour creamy: snout with sooty marks: each scute on the upper half of the body from the nape to the end of the tail with a grey ring, which touches its fellow in the median dorsal line, the upper angle bisecting the

rings: lower half of trunk with brown, diamond-shaped outlines, alternating with the rings above.

Hab. South Australia.

LISSOCAMPUS gen. nov.

Body smooth, without ridges, the angles scarcely defined: dorsal fin short: pectorals present. Tail long, with fin. Allied to *Nannocampus* Günth.

LISSOCAMPUS CAUDALIS sp. nov.

Fig. 46.

D.11: P.5?: C.10: Annuli 12+60: sub-dorsal annuli 1+2.

Snout 3.1 in the head: eye 2.0 in the snout and 6.2 in the head: head 2.5 in the trunk and 15.5 in the total length. Trunk 4.8 in the tail which is 1.3 in the total.

Head and body smooth: snout compressed, with an obtuse, elevated crest, which terminates on the interorbital space: a ridge on each side from the tip of the snout to the first nostril: occipital and nuchal ridges feeble. Body one-third deeper than wide, without ridges and the angles rounded: back convex and the ventral surface V-shaped but without keel. Tail almost round and very long, almost four-fifths of the total length. The dorsal fin commences on the posterior edge of the last body ring; it is very short and is situated on an elevation; the

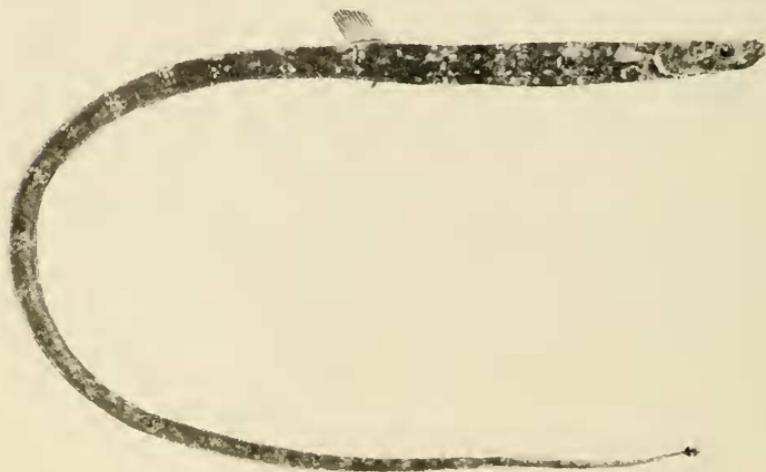


Fig 46. *Lissocampus caudalis*

longest ray is equal in length to the base of the fin, which is as long as the snout: pectoral as long as the snout: caudal fin a little longer than the pectoral: a minute anal fin.

Described from an example 97 mm. in length, one of two female specimens collected by Mr. Rumball at Kangaroo Is. in 1901; the other measures 102 mm.

Colours. Head brown, finely marked with white. Body light brown, with five large white spots on the back between the nape and the origin of the dorsal fin: similar, but less distinct spots on the caudal: dark brown bands encircle the body at about every fourth ring throughout the length; on the trunk the lighter interspaces are mottled with white.

Hab. South Australia.

LEPTOICHTHYS Kaup, 1853 (*fistularius*).

LEPTOICHTHYS FISTULARIUS Kaup (*Bibron*).

Leptoichthys fistularius Kaup, Arch. f. Naturg., xix, 1853, p. 232, and Cat. Lophob., 1856, p. 52; Dum., Hist. Nat. Poiss., ii, 1870, p. 580; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 187; Cast., P.Z.S. Vict., ii, 1873, p. 77; Macl., P.L.S., N.S.W., vi, 1881, p. 295; Dunck., Fauna Südwest Aust., ii, 1909, p. 234.

Leptoichthys castelnaui Macl., P.L.S., N.S.W., vi, 1881, p. 295.

Fig. 47.

D.35-37 (34-38): P.22 (21-23): A.4: C.10 (11): Annuli 25-26 (28)+20 (23-27): sub-dorsal annuli 3-4+5-6: brood annuli 19-23+0.

Head 2.0 to 2.5 in the trunk and 5.3 to 6.0 in the total length: snout 1.4 in the head: eye 7.1 in the snout and 10.0 in the head. Trunk 2.3 in the length.

Snout very long, four times as long as the post-orbital portion of the head, compressed but not deep: a rudimentary crest and very feeble supraorbital ridges: snout with reticulating raised lines: rest of head and body uniformly granular: opercles with additional radiating striae but no median keel. Indication of a nuchal ridge. Body a little wider than deep: ventral surface wider than that of the dorsal: trunk longer than the tail. Ridges moderately well defined: upper ridge continued on to the fifth caudal scute, below the origin of the ridge, which commences on the side and attains the dorsal profile at the sixth ring: lower ridge continuous. Caudal fin rather large and long, the median rays longest, nearly as long as the snout: a minute anal fin. Longest example 360 mm. dredged by Sir Joseph Verco in Spencer Gulf. Also taken in St. Vincent Gulf by Capt. J. J. Hughes.

Fig. 47 *Leptoichthys fistularius*.

Colours. Head light brown, opercles opalescent below. Body brown, darker above, with some indications of markings: a dark brown marking on the anterior edges of each scute; ventral surface of trunk opalescent, that of tail light brown.

Hab. Victoria, South Australia, and south coast Western Australia.

STIGMATOPORA Kaup, 1853 (argus).

- a. Sub-dorsal annuli 7-10+8-12; no opercular keel in adult; body of female depressed *argus*
- aa. Sub-dorsal annuli 10-12+6-7; an opercular keel; body of female depressed and expanded *nigra*

STIGMATOPORA ARGUS Richardson.

Syngnathus argus Rich., P.Z.S., 1840, p. 29 and T.Z.S., iii, 1849, p. 183, pl. vii, fig. 2.

Stigmatopora argus Kaup, Arch. f. Naturg., xix, 1853, p. 233.

Stigmatophora argus Kaup, Cat. Lophob., 1856, p. 53; Dum., Hist. Nat. Poiss., ii, 1870, p. 583; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 189; Cast. P.Z.S., Vict., ii, 1873, p. 77; Macl., P.L.S., N.S.W., vi, 1881, p. 297; Dunck., Fauna Südwest Aust., ii, 1909, p. 239.

Stigmatophora olivacea Cast., P.Z.S., Vict., i, 1872, p. 244 and ii, 1873, p. 77; Ogil., Mem. Qld. Mus., i, 1912, p. 36.

Gastrotokcus gracilis Klunz., Arch. f. Naturg., xxxviii, 1872, p. 44.

Stigmatophora unicolor Cast., Res. Fish. Aust., 1875, p. 49.

Stigmatophora depressinscula and *gracilis* Macl., P.L.S., N.S.W., vi, 1881, p. 209.

Stigmatophora argus var. *brevicaudata* Lucas, P.R.S., Vict., iii (n.s.), 1891, p. 14.

Syngnathus olivacea and *Syngnathus argus* Zietz, T.R.S., S.A., xxxii, 1908, p. 298.

Fig. 48.

D.43-50 (55): P.16 (14-17): A.3 (2-4): Annuli 18-22 (17)+78-90 (68): sub-dorsal annuli 9-10 (7)+8-10 (12); brood annuli 0 (1)+18-20 (16).

Head 1.3 in the trunk and 5.2 to 6.4 in the total length: snout 1.5 in the head: eye 6.2 to 7.6 in the snout and 9.9 to 10.9 in the head. Trunk 1.7 to 2.8 in the tail and 3.5 to 4.8 in the total.

Snout long and slender, more than twice as long as the rest of the head, with a low median crest which terminates in advance of the eyes: the supraorbital ridges commence on the posterior third of the snout, but do not extend to behind the eyes: a lateral ridge from the angle of the mouth to the lower part of the front edge of the eye: low ridges define the lower margins of the snout, one on each side of a median ventral ridge, which bifurcates below the front margins of the eyes: head finely pitted: opercles with additional radiating striae: a feeble opercular ridge in young examples. Body depressed, widest at the middle of the trunk, one and two-fifths to one and one-half times wider than deep in the male, rather more depressed in the female and one and three-fifths to one and four-fifths times wider than deep: dorsal surface slightly convex. Upper and lower ridges continuous, much more distinct on the tail; the lateral ridge extends on to about the sixth caudal scute or terminates in the skinny folds of the brood pouch: ventral ridge terminates at the anus. Tail about half of the total length, a little longer in the male. Longest example 250 mm.

Colours. The colours and markings are subject to considerable variation: the following descriptions result from the examination of many specimens from Spencer and St. Vincent Gulfs and Fowler's Bay.

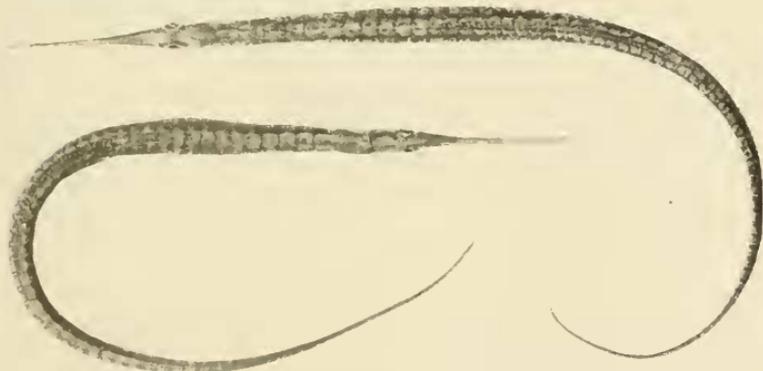


Fig. 48. *Stigmatopora argus*, female and male.

Male. Head and snout dark green, opercles opalescent below. Body olive green above with a narrow whitish bar across each ring, becoming less distinct on the tail; bars sometimes present on the snout also. Underside of trunk dusky, the sutures of the scutes darker; ventral surface of tail lighter, often with bars; caudal ridges black. Brood pouch whitish, or pink when containing young, with longitudinal black streaks. A few examples have the snout and head light brown and the upper surface of the body and tail yellowish brown; numerous black dots, edged with white, on the trunk where additional faint, white transverse bars are often present. Underside sometimes pale without markings.

Female. Snout and head dusky; opercles opalescent; body dusky olive, darker above, with numerous black, white-edged dots between the nape and the first third of the tail; tail much lighter posteriorly. Others have the ground colour light yellowish brown and some have indications of the white transverse bars usually associated with the male.

The dotted back is a fairly constant feature of the female, but also, though more rarely, occurs in the male; these dots are sometimes placed in regular series or they may be scattered or irregular.

Hab. New Guinea, Australia, Queensland excepted, and Tasmania.

One of the characters of the genus *Stigmatopora* is the absence of a caudal fin, the tail gradually tapering to a very fine point. It happens, however, that this attenuated tail is very rarely preserved in its entirety and knowing that no fin is developed, writers have presumed their specimens to be complete and so stated the caudal rings at varying figures short of the full number. The figures here given are believed to represent the variations of the complete member. We have examined a large number of specimens preserved in this Museum, including series labelled *S. argus* and *S. olivaceus*; it happens that all the latter are males with approximately complete tails, and this leads us to refer to the question of sexual colouration. As mentioned above the markings for the sexes are not absolutely constant, tending in a small proportion of examples to assume the markings of both sexes in the same individual. Thus the spotted females may possess faint bars, and the barred males develop spots also. We have no hesitation in pronouncing normally barred examples (*S. olivaceus*) to be males of *S. argus*. Ogilby⁽¹⁰⁾ examined two specimens of the genus from South Australia preserved in the Queensland Museum and identifying them with *S. olivacea* wrote: "The species is certainly valid." It may be noticed that at the time, he was recording an example of *S. nigra*, from which, of course, the South Australian specimens are distinct. It is sufficiently significant that he did not mention *S. argus*.

(10) Ogilby, Mem. Queenl. Mus. i, 1912, p. 36.

STIGMATOPORA NIGRA Kaup.

Stigmatopora nigra Kaup, Arch. f. Naturg., xix, 1853, p. 233?

Stigmatopora nigra Kaup, Cat. Lophob., 1856, p. 53; Dum., Hist. Nat. Poiss., ii, 1870, p. 583; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 190; Cast. P.Z.S., Vict., i, 1872, p. 201 and ii, 1873, p. 39 and Res. Fish. Aust., 1875, p. 48, and P.L.S., N.S.W., iii, 1879, p. 355; Macl., P.L.S., N.S.W., vi, 1881, p. 297; Dunck., Fauna Südwest Aust., ii, 1909, p. 239; Ogil., Mem. Qld. Mus., i, 1912, p. 36; McCull., Aust. Zool., i, 1914, p. 29, text fig. 1, 2, 3 (incomplete).

Stigmatopora boops Cast., P.Z.S., Vict., i, 1872, p. 203; Macl., P.L.S., N.S.W., vi, 1881, p. 298.

Syngnathus pelagicus Zietz, T.R.S., S.A., xxxii, 1908, p. 298 (not of Linn.).

Fig. 49.

D.35-41 (43): Annuli 17-18 (16)+70 (58-72): sub-dorsal annuli 10-12+6-7: brood annuli 0+14.

Head 1.6 in the trunk and 5.4 to 6.8 in the total length: snout 1.6 to 1.7 in the head: eye 5.0 to 6.3 in the snout and 8.0 to 10.0 in the head. Trunk 1.6 to 2.2 in the tail and 3.2 to 4.2 in the total.

Snout long and slender, twice as long as the postorbital portion of the head, with a low median crest and other ridges similar to those of *S. argus*: head finely pitted: opercles with radiating striae below the well defined keel. Body a little

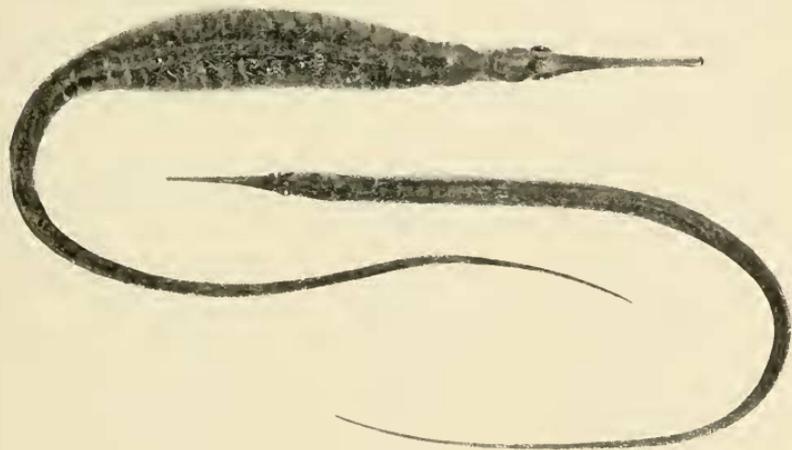


Fig. 49. *Stigmatopora nigra*, female and male.

wider than deep in the male and more than twice as wide as deep in the female; dorsal surface slightly convex. Upper and lower body ridges continuous: the lateral ridge extends on to the anterior caudal scute and, in the female, is produced to form a sharp edge to the greatly expanded body. Tail about half of the total length in the female, longer in the male. Vent situated under the posterior half of the dorsal fin. Several females dredged in Spencer and St. Vincent Gulfs by Sir Joseph Verco and two males collected by Mr. P. Geisler from St. Vincent Gulf: longest example 108 mm.

Colours. Snout dusky. Body light green, with a great number of tiny black dots, massed on the underside to form a dark bar on each scute.

Hab. New South Wales, Victoria, Tasmania, South Australia.

SOLEGNATHUS Swainson, 1839 (*hardwickii*).

SOLEGNATHUS ROBUSTUS McCulloch.

Solenognathus spinosissimus Zietz, T.R.S., S.A., xxxii, 1908, p. 299 (not of Günth.).

Solegnathus robustus McCull., Endeavour Res., i, 1911, p. 28, pl. ix, fig. 2.

Fig. 50.

D.29-31 (34); P.24-25; A.3; Annuli 27 (26)+48-53; sub-dorsal annuli 0+10.

Head 2.7 in the trunk and 6.4 in the total length; snout 1.9 in the head, its depth equal to one-fifth of its length; eye 3.9 in the snout and 7.4 in the head; narrowest interorbital space less than half the diameter of the eye. Body very deep, 1.7 times deeper than wide. Tail about 2.4 in the total length, its depth behind the dorsal fin 2.75-3.0 in the base of that fin. The last 26-30 tail rings constitute the prehensile portion.



Fig. 50. *Solegnathus robustus*.

McCulloch says that the dorsal fin occupies 10 "body rings", caudal rings being meant; he also gives the length of the head as "3.7 in the trunk", but his drawing shows 2.7 to be intended. The term "broad" used in connection with the character of the snout should probably be read as "deep."

The length of the tail is subject to slight variation; in two of our examples it is less than the distance between the vent and the pectoral fin, in a third it is

as long as the trunk. Specimens are known from Corney Point, Pt. Lincoln, and Flinders Is., the longest being 364 mm.

Hab. South Australia.

PHYLLOPTERYX Swainson, 1839 (foliatus).

- a. Profile of body slightly angular; ventral segmental spines short;
foliate appendages usually simple *foliatus*
aa. Profile of body extremely angular; ventral segmental spines long;
foliate appendages multifold *eques*

PHYLLOPTERYX FOLIATUS Shaw.

Syngnathus foliatus Shaw, Gen. Zool., v, 1804, p. 456, pl. clxxx.

Syngnathus taeniopterus Lacep., Ann. Mus., iv, 1804, p. (184-211), pl. lviii, fig. 3.

Phyllopteryx foliatus Swains., Nat. Hist. Fish., ii, 1839, p. 332, fig. 109; Kaup, Cat. Lophob., 1856, p. 21; Günth., P.Z.S., 1865, p. 327, pl. xiv and Cat. Fish. Brit. Mus., viii, 1870, p. 190; Dum., Hist. Nat. Poiss., ii, 1870, p. 532; Macl., P.L.S., N.S.W., vi, 1881, p. 301; McCoy, Prod. Zool. Vict., dec. vii, 1882, pl. lxx, fig. 1; Dunck., Fauna Südwest Aust., ii, 1909, p. 236.

Phyllopteryx elongatus Cast., P.Z.S., Vict., i, 1872, p. 243 and ii, 1873, p. 70.

Phyllopteryx altus McCoy, Prod. Zool. Vict., dec. vii, 1882, p. 20.

Fig. 51.

D.27-33 (36): P.20-23 (24): A.+: Annuli 17-18+32-37: sub-dorsal annuli 1-2+5-6 (7): brood annuli 0+17-19.

Snout 1.4 in the head: eye 7.1 in the snout and 10.1 in the head in adult examples. Tail 2.5 in the total length.

Snout very long, three and one-half times as long as the postorbital portion of the head, with a pair of small spines on the upper surface behind the middle of its length: a small spine on the front edge of the orbit: supraorbital ridges convergent before the eyes: two spines over each eye, the anterior one being directed backwards, the other laterally: a small patch of bristle-like spines below the hinder part of the orbit and a row of spines on the lower edge of the eye occasionally present: occiput much elevated, terminating in a blunt spine which bears a single appendage: opercles granulated, with raised lines radiating from one or two small spines: a pair of spines in front of the lower half of each pectoral base. A long nuchal spine bearing an appendage: a similar pair on the back behind the middle of the trunk and another pair midway between the ends of the pectoral fins and the vent: a short, blunt spine on each side at the commencement of the dorsal fin: four pairs of compressed and often serrated spines with appendages at equal intervals on the tail behind the dorsal fin; one spine

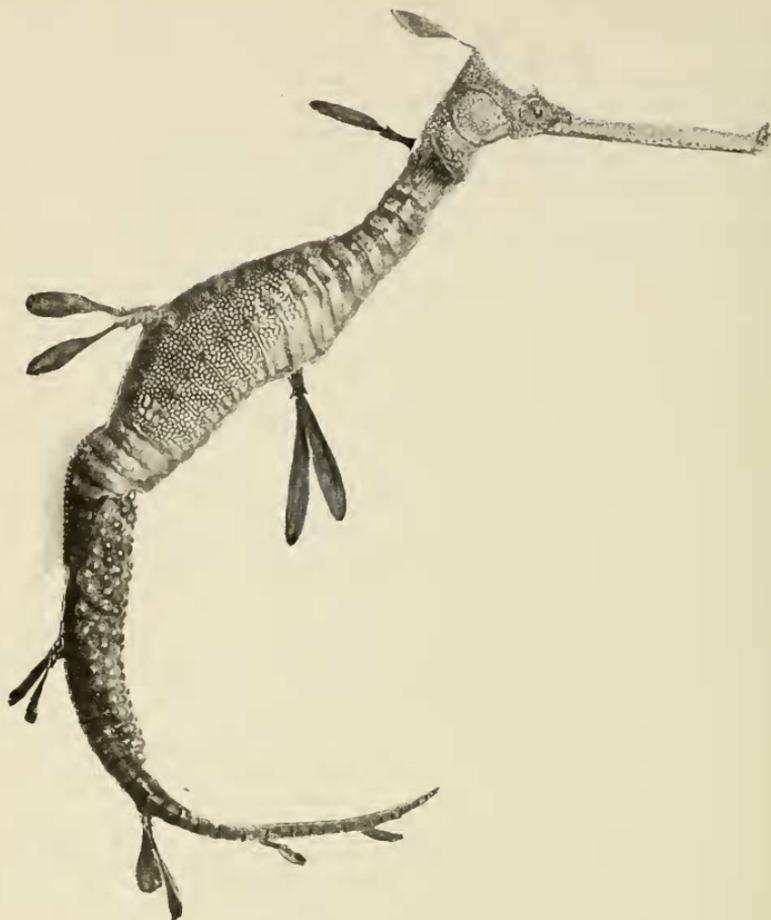


Fig 51. *Phyllopteryx foliatus*.

from each of the two last pairs is usually missing: each of the appendage-bearing spines terminates in two sharp spikes. Body ridges with series of small, thorn-like spines, those on the dorsal ridge strongest alongside the fin and almost obsolete on the dorsal arch: upper caudal ridge commences on the last two body rings and attains the dorsal profile at the termination of the dorsal fin; the spines on this ridge are strongest anteriorly. Body much compressed in adults, being

three and one-fourth times as deep as wide in a large female, lower in the male: in young examples the body is only one and four-fifths times deeper than wide.

The eggs are large, being about 4.5 mm. in diameter, 120 were attached to the male here illustrated.

Adult examples are 350 mm. in total length.

Life Colours. Back of body dark olive: head and sides of abdomen yellow, with dark lines, forming a fine network, snout brown with round white dots, tip yellow: sides of thorax hyaline, with seven oblique purple bars, similar bars on the abdomen, in outline only. Three purple spots on each side of the vent, the middle spot large. Throat and lower part of trunk deep lemon yellow. Back of tail reticulated like sides of abdomen, sides plain yellow, terminal third wholly black. Spines coloured like the snout, appendages purple with black edges, dorsal and pectoral fins pink. Eggs on male, taken December 6, 1920, ruby coloured. The small tags, as figured by McCoy, beneath the snout, are not present in any specimen we have seen.

Hab. Southern Australia from New South Wales to Western Australia and Tasmania.

PHYLLOPTERYX EQUES Gunther.

Phyllopteryx eques Günth., P.Z.S., 1865, p. 327, pl. xv and Cat. Fish. Brit. Mus., viii, 1870, p. 197; Dum., Hist. Nat. Poiss., ii, 1870, p. 533; MacL., P.L.S., N.S.W., vi, 1881, p. 302; Dunck., Fauna Südwest Aust., ii, 1909, p. 237.

Phycodurus eques Gill, Proc. U.S. Nat. Mus., xviii, 1895, p. 150.

Fig. 52.

D.35-37: P.21 (19-20): A.4: Annuli 18 (19)+36-40: sub-dorsal annuli 0.1+11; brood annuli, caudal 4th-23rd.

Snout 1.6 to 1.7 in the head: eye 4.8 to 5.1 in the snout and 8.0 to 8.5 in the head: head 1.3 in the trunk, which is 3.3 in the total length.

Snout long, more than twice as long as the postorbital portion of the head; a small spine on the posterior third of each of its upper edges: a pair of small branched filaments beneath the lower jaw and another pair of trilobed appendages behind the middle of the lower edge of the snout: forehead produced forwards and upwards into a sub-quadrangular crest, overhanging the posterior third or fourth of the snout: a pair of spines over the eyes: a bifurcate spine projects laterally from the upper margin of each orbit: occiput much elevated, with two blunt spines on its summit bearing bunches of narrow, branched appendages: a long and slender or feeble spine on the upper angle of the opercle. Nape with a strong spine, the lower half of which is dilated and compressed to form a ribbed

crest with serrated edges; top of spine with two sharp spikes and a long bi- or tri-lobed appendage: a pair of slender spines in front of the lower half of each pectoral base: body compressed, two and one-third to two and two-third times deeper than wide: dorsal profile of body arched: ventral profile with three deep indentations: vent situated in the last. As described by Günther the many spines differ in character and there are three sorts: (a) strong and much compressed,



Fig. 52. *Phyllopteryx eques*.

the base being in some instances equal to the height: such spines terminate in a pair of sharp points and bear long bi- or tri-lobed foliaceous appendages: they are situated as follows: one pair on the arch of the dorsal profile; another pair on each of the abdominal dilations: three to five pairs on the upper edges of the tail, the first pair at the posterior fourth of the dorsal fin: two to three single spines

with appendages near the termination of the tail: (b) long, compressed, flexible, lanceolate (some of them spatulate in old examples), without appendages and often with finely serrated edges: these occur in pairs along the edges of the dorsal surface as far as the second third of the dorsal fin and singly along the middle of the ventral surface between the neck and the vent. Three pairs of very broad compressed spines on the anterior part of the ventral surface of the tail: (c) small sharp spines, situated singly along the lateral line and terminating a short distance beyond the vent: these may be somewhat scattered and in old examples some of them are spatulate with serrated edges; another series along each of the lateral abdominal edges. Tail about half of the total length. Anal fin as high as the eye. The egg-bearing area occupies the ventral and lateral surfaces of three-fourths of the length of the tail: each egg is about 4 mm. in diameter. Adult examples are about 300 mm. in total length.

Colours. Pale brown in spirit, darker above: sides with a white or silvery, dark-edged stripe across each body scute: foliaceous appendages dusky.

Hab. South Australia.

ACENTRONURA Kaup, 1856 (*gracilissima*).

ACENTRONURA AUSTRALE sp. nov.

Fig. 53.

D.15: Annuli 12+38: sub-dorsal annuli 3+1: brood annuli 0+12.

Female. Snout 2.0 in the head: eye 1.8 in the snout and 5.3 in the head: head 2.0 in the trunk and 6.8 in the total length: trunk 2.0 in the tail.

Snout shorter than the postorbital portion of the head: supraorbital spines blunt, triangular, each bearing a tufted filament longer than the snout and converging before the eyes where they form a small spike: occiput elevated, much compressed, a tufted filament on its summit and one on each side of the base posteriorly: a low nuchal ridge, highest anteriorly: opercles smooth, without spines or ridges. Body deepest anteriorly, being nearly twice as deep as wide: ridges rather feebly raised, but the angles well defined: the upper body ridge terminates below the middle of the dorsal fin and above the origin of the caudal ridge, which forms the upper angle of the tail: the tail is quadrangular in section: median lateral ridge continuous with lower caudal ridge: lower lateral and ventral ridges terminate at the vent: a very feeble spine at the intersection of these ridges with the faintly raised margins of the scutes: about every third spine bears a tufted filament. Base of dorsal fin elevated: a minute anal fin.

Described from an example 54.5 mm. in total length from St. Vincent Gulf.

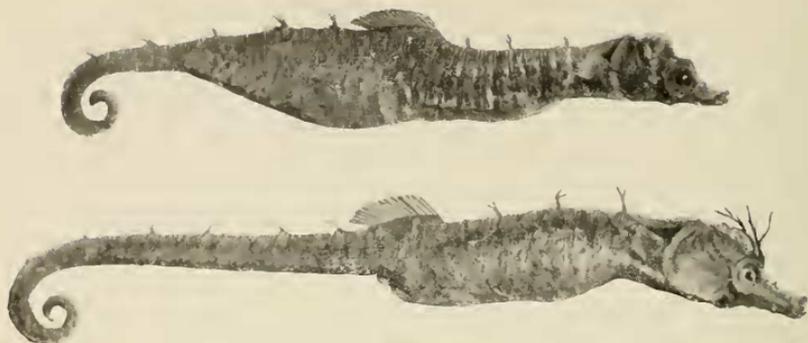


Fig. 53 *Acentronura australe*, male and female

Male. Snout 3.2 in the head; eye 1.5 in the snout and 5.0 in the head; head 1.7 in the trunk, which is 1.4 in the tail.

Snout two-thirds as long as the postorbital portion of the head, supraorbital spines triangular, compressed, sharp, without filaments; spine in front of the eyes extremely small; a few filaments on the body and tail spines but none on the head. Upper lateral ridge on one side of the body continuous with upper caudal ridge; that on other side not continuous and terminating below the middle of the dorsal fin as in the female example. Body three times as deep as wide.

An example 46 mm. in total length from the same locality?

Colours. The colours of both specimens are completely bleached after long immersion in spirit.

The genus was named from specimens obtained in Japan and was recognized from India by Day, who identified his specimens with the same species (*A. gracilissima*). It may be doubted if the species are identical. Ours appears to be different, the dorsal edges being not continuous with the tail whereas in *A. gracilissima* they are said to be unbroken; the number of body rings is perhaps also different.

Hab. South Australia.

HIPPOCAMPUS Rafinesque, 1810 (hippocampus).

- | | | | | | | |
|-----|-------------------------------------|-----------------------------------|----|----|----|-------------------------|
| a. | Dorsal rays 26-31 on about 7 annuli | .. | .. | .. | .. | <i>abdominalis</i> |
| aa. | Dorsal rays 16-22 on 3 to 5 annuli | | | | | |
| | b. | Snout long, half the head | .. | .. | .. | <i>novae-hollandiae</i> |
| | bb. | Snout shorter, one-third the head | .. | .. | .. | <i>breviceps</i> |

HIPPOCAMPUS ABDOMINALIS Lesson.

Hippocampus abdominalis Less. in Ferussac, Bull. Sci. Nat., xi, 1827, p. 127;

Kaup, Cat. Lophob., 1856, p. 17, pl. iii, fig. 3; Dum., Hist. Nat. Poiss., ii, 1870, p. 524; Günth. Cat. Fish. Brit. Mus., viii, 1870, p. 199; MacL. P.L.S., N.S.W., vi, 1881, p. 304; Waite, Rec. Cant. Mus., i, 1907, p. 15 and 1911, p. 175, pl. xxviii; Dunck., Fauna Südwest Aust., ii, 1909, p. 247; McCull., Endeavour Res., i, 1911, p. 29, pl. vi, fig. 1 and 2, 1914, p. 94.

Hippocampus graciliformis McCull., Endeavour Res., i, 1911, p. 29, pl. vi, fig. 2.

Fig. 54.

D.28 (26-31): P.16 (14-17): A.(4). Annuli 11 (13)+47 (44-49): sub-dorsal annuli + (3-5)+3 (5): brood annuli 0 (1)+5 (7).

Snout 2.5 in the head: eye 2.5 in the snout and 6.0 in the head. Head 1.7 in the trunk and 6.8 in the total length: trunk 2.6 in the tail.

Snout as long as the postorbital portion of the head: a pair of simple supra-orbital spines converges before the eyes to form a very short and high crest on the proximal portion of the snout: narrowest interorbital space equal to half the diameter of the eye: occiput elevated, compressed, with some low knobs: a simple spine on the upper angle of the opercle and three others at equal intervals on the hinder margin: opercle with raised lines radiating from a low knob behind the eye. Body two and one third times deeper than wide: the upper ridge terminates below the end of the dorsal fin: caudal ridge commences on the last second body scute and forms the upper angle of the tail, which is quadrangular in section: median lateral ridge continuous with the lower caudal ridge: lower lateral ridge terminates in advance of the vent: abdomen with a keel: edges of each scute raised and produced as blunt spines or knobs where they intersect the ridges. Tail more than twice as long as the trunk. A single male from the Coorong 140 mm. in length. McCulloch also records two specimens from Investigator Strait.

Colours. Completely bleached: a female example collected by Mr. Harold Sexton from Devonport, Tasmania, is beautifully marked as follows: Snout pale yellow, with dark, circular spots on the posterior half and others almost encircling the eye: opercles and occiput darker, the former with dark brown spots. Back of body dark brown: sides dusky with dark brown, semicircular marks: abdominal keel, spines and ridges lighter. Tail dusky, darker above, with about twelve light yellow rings. Dorsal fin pale, irregularly mottled with dark brown.

Hab. New South Wales, Victoria, South Australia, and Tasmania.

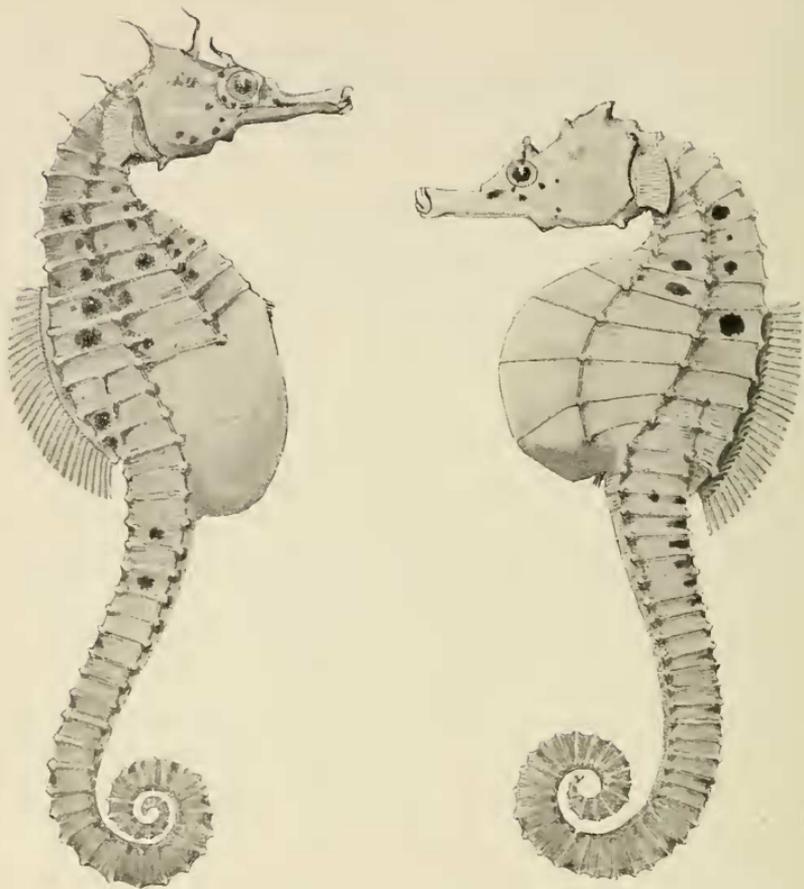


Fig. 54. *Hippocampus abdominalis*, male and female.

HIPPOCAMPUS NOVAE-HOLLANDIAE Steindachner.

Syngnathus hippocampus Shaw in White's Voy. N.S.W., 1790, p. 205, pl. 1, fig. 2 (not of Linn.).

Hippocampus novae-hollandiae Steind., Sitzb. Akad. Wiss. Wien, liii, 1866, p. 474, pl. i, fig. 2; Dum. Hist. Nat. Poiss., ii, 1870, p. 517; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 201; Cast., P.Z.S., Vict., i, 1872, p. 197; MacL. P.L.S., N.S.W., vi, 1881, p. 305; Dunck., Fauna Südwest Aust., ii, 1909, p. 248.

Fig. 55.

D.17 (16); P.16 (15); A.4; Annuli 11+34+36 (33); sub-dorsal annuli 3 (2)+1; brood annuli 1+4.

Head 1·2 in the trunk and 5·3 in the total length; snout 2·0 in the head; eye 3·5 in the snout and 7·0 in the head. Trunk 4·3 in the total.

Snout as long as the rest of the head: the supra-orbital ridges converge to form a slight elevation in front of the eyes and each terminates posteriorly in a low, blunt spine over the hinder margin of the eye: narrowest interorbital space equal to half the diameter of the eye: one or two low protuberances on the anterior profile of the compressed occiput: coronet with five or six blunt points: opercle with faintly raised lines radiating from a knob behind the eye, a blunt spine on the upper angle and three others on the hinder margin. Nuchal crest high. Body three and one-third times deeper than wide: the upper body ridge terminates below the end of the dorsal fin: upper caudal ridge commences on the ninth or tenth body scute and forms the upper angle of the tail, which is quadrangular in section: median lateral ridge continuous with lower caudal ridge: lower lateral and ventral ridges terminate at the vent. Edges of each scute ridged, the ridges produced as blunt spines or protuberances at the points of intersection with the angles of the body: every third or fourth spine on the dorsal profile more pronounced: in old examples all the spines are markedly obtuse. Spencer Gulf.

Colours. Specimens examined bleached.

Hab. South Australia, Victoria, and New South Wales.



Fig. 55. *Hippocampus
novae-hollandiae.*

HIPPOCAMPUS BREVICEPS Peters.

Hippocampus breviceps Peters, Mon. Akad. Wiss. Berlin, 1869, p. 710; Dum., Hist. Nat. Poiss., ii, 1870, p. 521; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 200; Cast., P.Z.S., Vict., i, 1872, p. 168; MacL., P.L.S., N.S.W., vi, 1881, p. 305; McCoy, Prod. Zool. Vict., dec. vii, 1882, pl. lxx, fig. 2; Dunck., Fauna Südwest Aust., ii, 1909, p. 247.

Hippocampus tuberculatus Cast., Res. Fish. Aust., 1875, p. 48.

Fig. 56.

D.19-21 (22): P.14 (15): A.4: Annuli 11+38-42: sub-dorsal annuli 3-4+1; brood annuli 1-2+3-4.

Snout 3.0 in the head: eye 2.1 in the snout and 6.5 in the head: head about 1.5 in the trunk.

Snout short, about two-thirds as long as the postorbital portion of the head: the supraorbital ridges converge to form an elevation in front of the eyes and each terminates posteriorly in a blunt spine over the middle of the eye: eye almost encircled with a series of low tubercles: a small spine in advance of the elevated occiput, which has some blunt knobs on its summit: a small spine at the upper

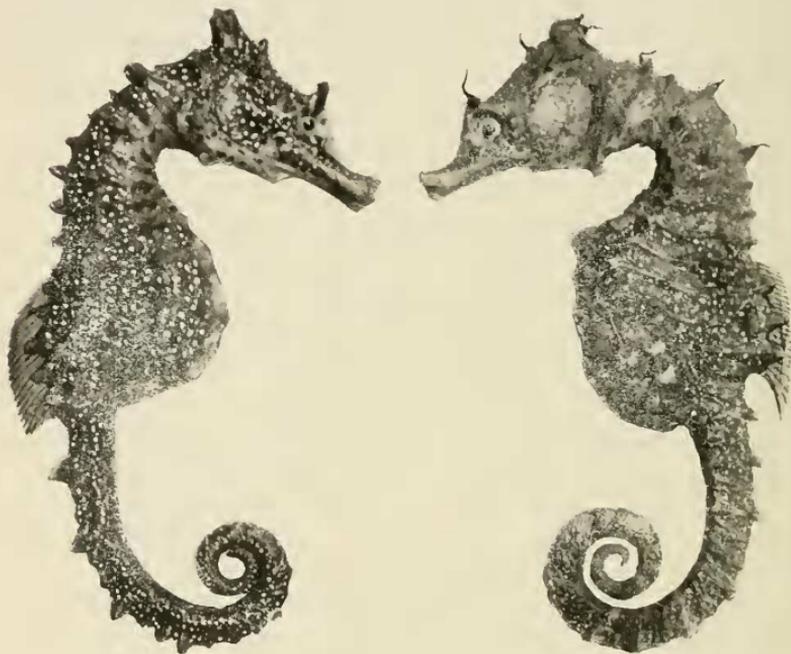


Fig. 56 *Hippocampus breviceps*, male and female

angle of the opercle and two or three others on its hinder margin: opercles with raised, radiating lines. Base of dorsal fin elevated. The upper body ridge terminates below the end of the dorsal fin: the upper angle of the tail, which is quadrangular in section, commences on one of the last two body scutes: median lateral ridge continuous with lower caudal ridge: lower lateral ridge terminates opposite

the vent. Edges of each scute ridged, the ridges produced as spines or protuberances at the points of intersection with the angles of the body: every alternate or third spine on the dorsal aspect more pronounced, those on each side of the fin often strongly produced upwards: an examination of a large series of specimens indicates that the filaments attached to the spines vary greatly in length, number and character, irrespective of age or sex; some of the variations are as follows: (a) no traces of filaments: (b) simple filaments as long as, or longer than, the snout, situated on the supraorbital, occipital, upper opercular and anterior dorsal spines and five or six on the coronet: (c) tufted, branched or simple filaments, occurring on all spines excepting the ventrals. In the male the body is considerably produced above the large brood pouch, where it is more than twice as deep as wide: several examples have the pouch tightly packed with ova, easily seen through the semi-transparent skin. In the female the body is not so deep. Largest specimen 70 mm. in length, dredged in St. Vincent Gulf by Sir Joseph Verco. Examples also from Spencer Gulf.

Colours. Head dark purplish brown, with numerous white, dark-edged ocelli: opercles with additional brown spots: underside of snout and chin pale with dark brown markings: several white lines running through the eye or the latter encircled by a series of brown dots. Body and tail dark purplish brown, with numerous small, white, dark-edged ocelli: underside of trunk pale, with darker markings anteriorly. Tail with about thirteen lighter cross bars below, or with indications of lighter rings.

Hab. South and Western Australia, New South Wales, Victoria, Tasmania.

RECENT LITERATURE.

Duncker listed the literature of the Australian Syngnathidae up to 1909; additions to his list are given below. Castelnau's "Researches on the fishes of Australia," which perhaps Duncker had not seen, and which title in any case does not convey the following information, was published in 1875, for the Philadelphia Centennial Exhibition, 1876.

- Duncker, *Fauna Südwest Australiens*, ii, Pisces, 1909, p. 233-250.
 Günther, *Fische d. Südsee*, iii, 1910, p. 428-436.
 McCoy, *Prod. Zool. Viet.*, dec. vii, 1882, pl. lxx.
 McCulloch, *Rec. Aust. Mus.*, vii, 1909, p. 317, 318.
 .. *Endeavour Res.*, i, 1911, p. 26-29, and ii, 1914, p. 94.
 .. *Rec. W.A. Mus.*, i, 1912, p. 82, 83.
 .. *Aust. Zool.*, i, 1914, p. 29-31.

Mculloch & Waite. Rec. S.A. Mus., i, 1918, p. 39, 40.

Ogilby, Mem. Queensl. Mus., i, 1912, p. 34-36.

Waite, Rec. Cant. Mus., i, 1911, p. 173-175.

Zietz, A. Trans. Roy. Soc. S. Aust., xxxii, 1908, p. 298, 299.